molecules

MDPI

Supplementary Materials

Development of Cycloaliphatic Epoxy-POSS Nanocomposite Matrices with Enhanced Resistance to Atomic Oxygen

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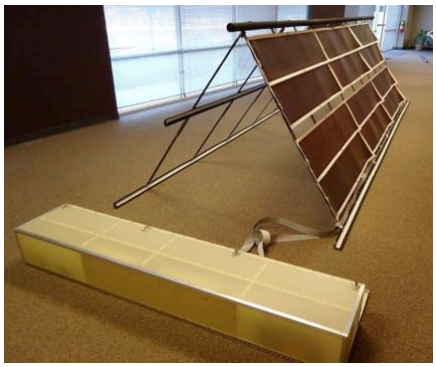
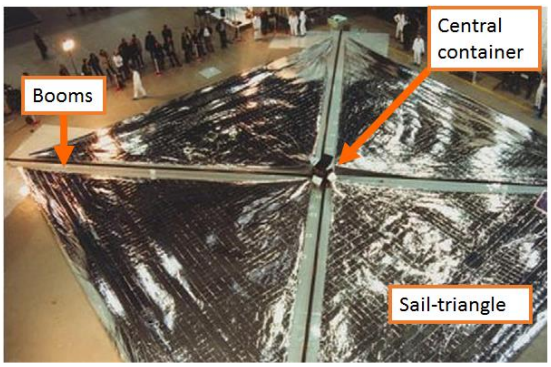
a) RAMM Integrated Antenna Mast System [7]

b) Motorised Camera mast on EADS Astrium Mars Rover [7]

c) Mirror Prototype [8]



d) Roll Out Solar Power System [7]



e) Solar Sail components [9]

Figure S1. Examples of applications of deployable structures.

Table S1. Microscopy for cured laminate surface with MTMM4-1 content and virgin Kapton™ H following exposure to AO in simulated space conditions for a period of 12 months.

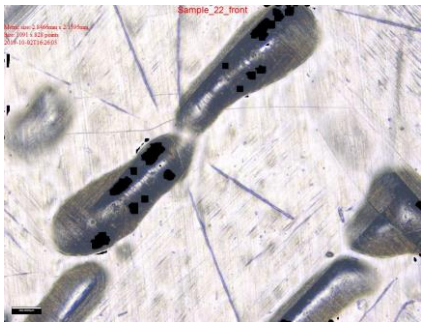
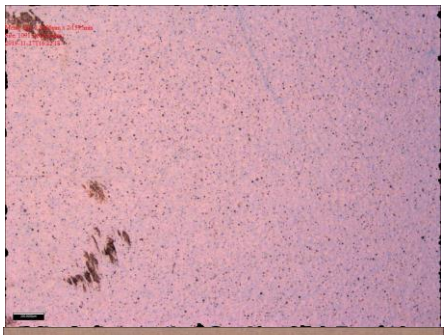
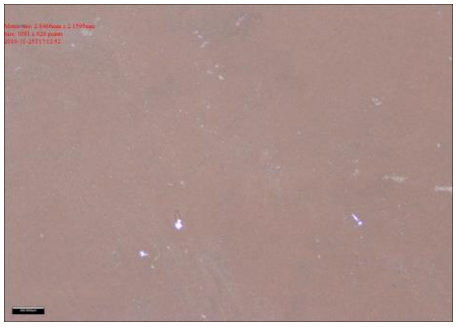
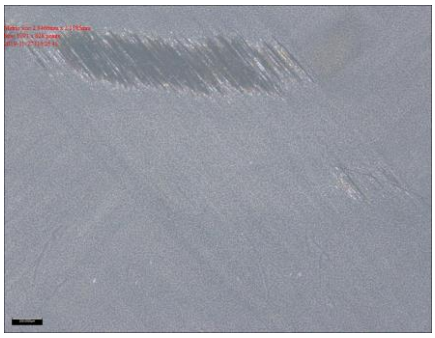
	MTM44-1	Kapton™ H
0 Months (before exposure)		
4 months		
8 Months		
12 Months		

Table S2. 3D Topographical analysis for cured laminate surface with MTMM4-1 content and virgin Kapton™ H following exposure to AO in simulated space conditions for a period of 12 months.

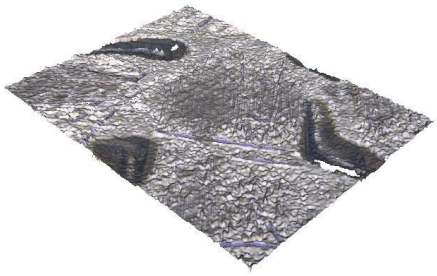
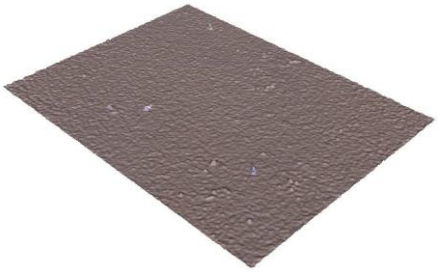
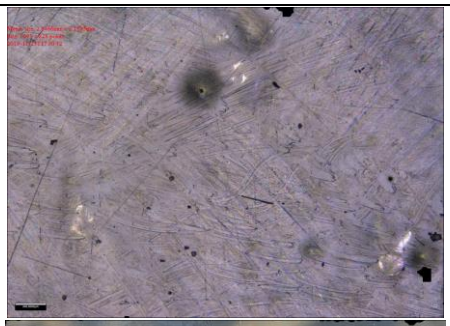
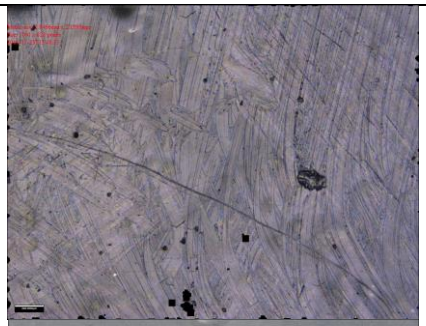
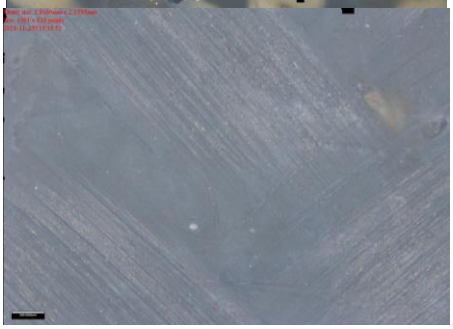
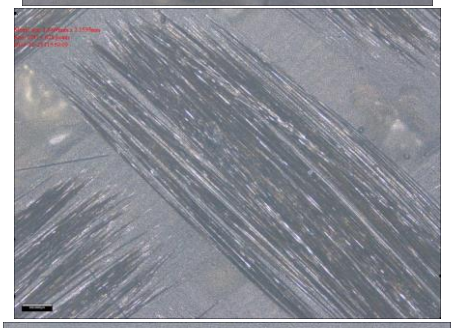
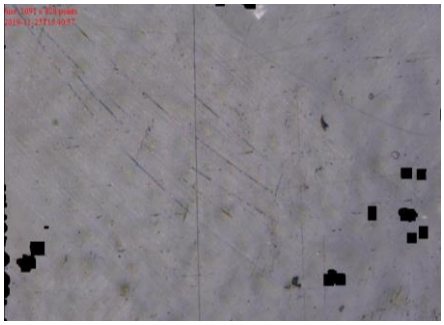
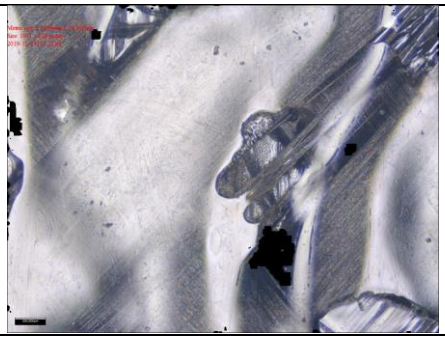
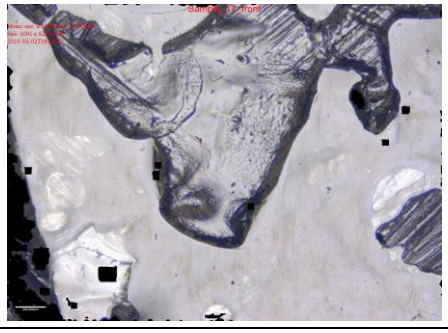
	MTMM4-1	Kapton™ H
0 Months (before exposure)		
4 months		
8 Months		
12 Months		

Table S3. Microscopy for cured laminate surfaces as a function of POSS content following exposure to AO in simulated space conditions for a period of 12 months.

Time of AO exposure	$1_{50}2_{50}3_{0}$	$1_{48}2_{48}3_{5}$
0 Months (before exposure)		
4 months		
8 Months		
12 Months		
	$1_{45}2_{45}3_{10}$	$1_{40}2_{40}3_{20}$
0 Months (before exposure)		

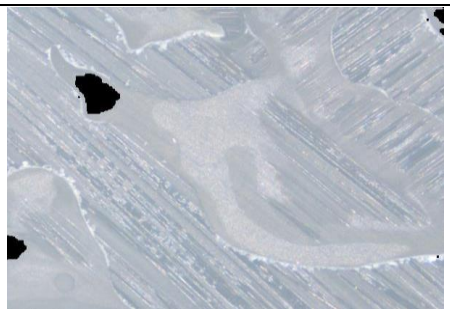
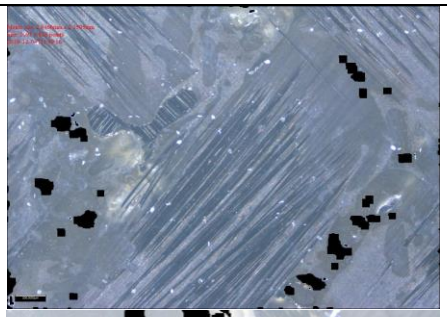
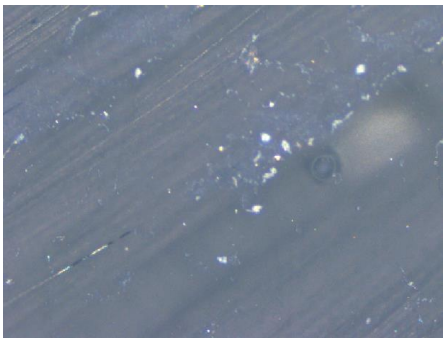
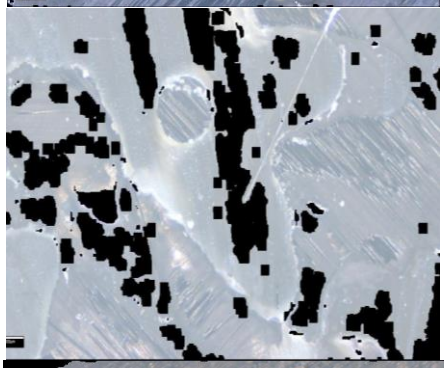
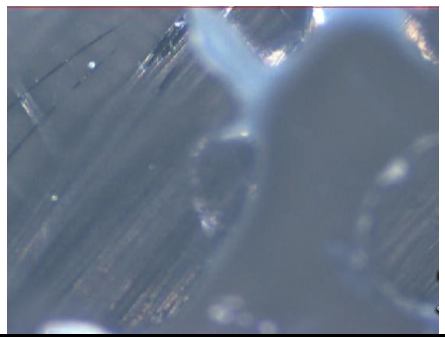
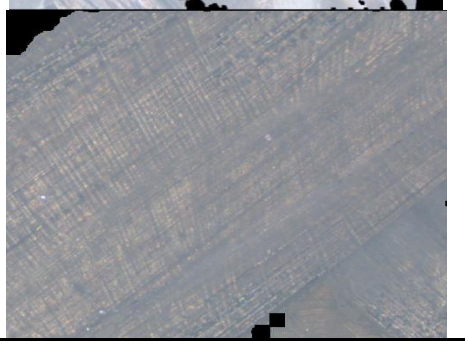
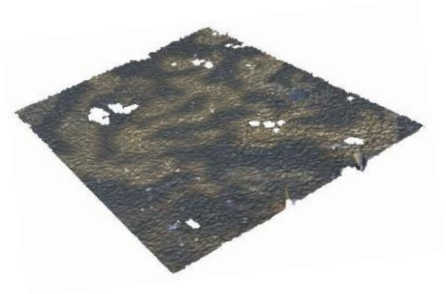
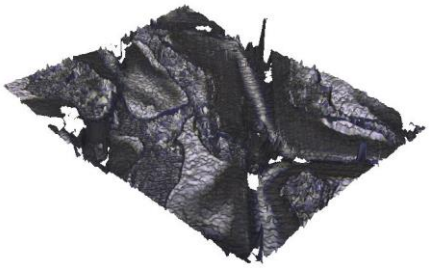
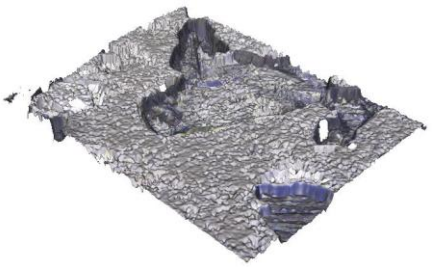
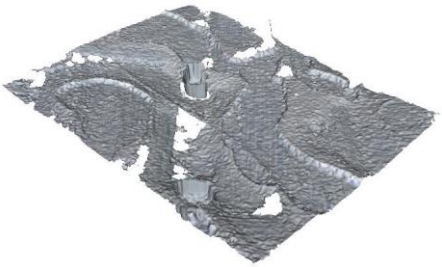
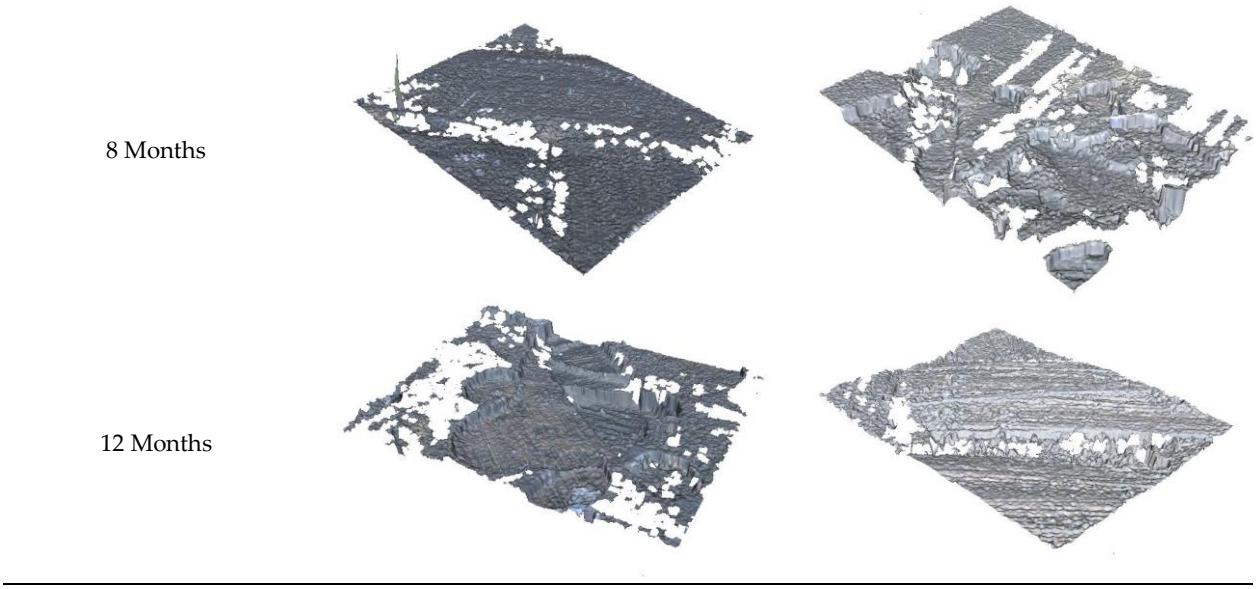
4 months		
8 Months		
12 Months		

Table S4. 3D Topographical analysis for cured laminate surfaces as a function of POSS content following exposure to AO in simulated space conditions for a period of 12 months.

AO exposure	$1_{50}2_{50}3_{0}$	$1_{48}2_{48}3_{5}$
0 Months (before exposure)		
4 months		
8 Months		
12 Months		
AO exposure	$1_{45}2_{45}3_{10}$	$1_{40}2_{40}3_{20}$
0 Months (before exposure)		
4 months		



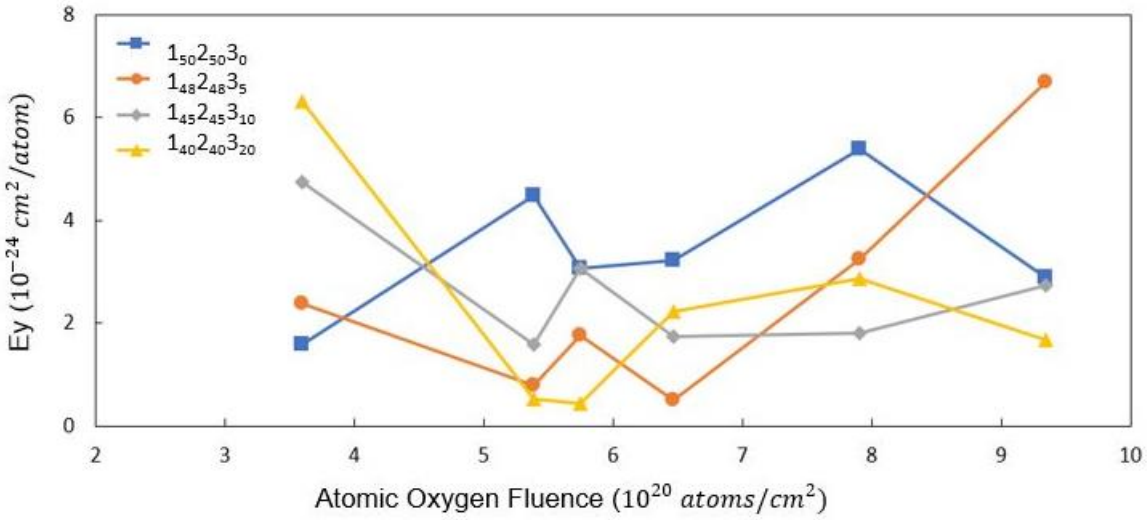


Figure S2. Erosion yield obtained for all the POSS content samples after exposure.

Table S5. Characteristic FTIR of the absorbance bands for the cured $1_{45}2_{45}3_{10}$ samples before and after 12 months of exposure in simulated LEO.

Wavenumber (cm^{-1})	Intensity	Functional Group
1100	Medium	POSS Cage Si-O-Si, asymmetric stretch
1450	Medium, Sharp	Aromatic ring, C=C stretch
1725	Strong, Sharp	Saturated carbonyl, C=O stretch
2850	Medium	Oxirane ring, C-H stretch
2920	Medium	Aliphatic amine, N-H stretch
3500	Strong, Broad	Secondary alcohol, O-H stretch